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## **Apache Corporation**

Lea County, NM (NAD83 NME)

NMGSA Unit #379

NMGSA Unit #379

OH

Plan: Plan #1 - 7-7/8" Hole

## **Standard Planning Report**

30 December, 2009



**Scientific Drilling**



Scientific Drilling  
Planning Report



|           |                            |                              |                             |
|-----------|----------------------------|------------------------------|-----------------------------|
| Database: | EDM 5000 1 Single User Db  | Local Co-ordinate Reference: | Site NMGSA Unit #379        |
| Company:  | Apache Corporation         | TVD Reference:               | GL Elev @ 3563.00ft (Rig ?) |
| Project:  | Lea County, NM (NAD83 NME) | MD Reference:                | GL Elev @ 3563.00ft (Rig ?) |
| Site:     | NMGSA Unit #379            | North Reference:             | Grid                        |
| Well:     | NMGSA Unit #379            | Survey Calculation Method:   | Minimum Curvature           |
| Wellbore: | OH                         |                              |                             |
| Design:   | Plan #1 - 7-7/8" Hole      |                              |                             |

|             |                            |               |                |
|-------------|----------------------------|---------------|----------------|
| Project     | Lea County, NM (NAD83 NME) |               |                |
| Map System: | US State Plane 1983        | System Datum: | Mean Sea Level |
| Geo Datum:  | North American Datum 1983  |               |                |
| Map Zone:   | New Mexico Eastern Zone    |               |                |

|                       |                 |              |               |                   |                  |
|-----------------------|-----------------|--------------|---------------|-------------------|------------------|
| Site                  | NMGSA Unit #379 |              |               |                   |                  |
| Site Position:        |                 | Northing:    | 588,216.05 ft | Latitude:         | 32° 36' 45.172 N |
| From:                 | Map             | Easting:     | 869,035.46 ft | Longitude:        | 103° 16' 8.731 W |
| Position Uncertainty: | 0.00 ft         | Slot Radius: | 0"            | Grid Convergence: | 0.57°            |

|                      |                 |         |                     |               |               |                  |
|----------------------|-----------------|---------|---------------------|---------------|---------------|------------------|
| Well:                | NMGSA Unit #379 |         |                     |               |               |                  |
| Well Position        | +N/-S           | 0 00 ft | Northing:           | 588,216 05 ft | Latitude:     | 32° 36' 45 172 N |
|                      | +E/-W           | 0 00 ft | Easting:            | 869,035 46 ft | Longitude:    | 103° 16' 8.731 W |
| Position Uncertainty |                 | 0 00 ft | Wellhead Elevation: |               | Ground Level: | 3,563.00 ft      |

|           |            |             |                 |               |                     |
|-----------|------------|-------------|-----------------|---------------|---------------------|
| Wellbore  | OH         |             |                 |               |                     |
| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|           | IGRF200510 | 2009/12/30  | 7.64            | 60.66         | 49,060              |

|                   |                       |            |               |               |
|-------------------|-----------------------|------------|---------------|---------------|
| Design            | Plan #1 - 7-7/8" Hole |            |               |               |
| Audit Notes:      |                       |            |               |               |
| Version:          | Phase:                | PLAN       | Tie On Depth: | 0.00          |
| Vertical Section: | Depth From (TVD) (ft) | +N/-S (ft) | +E/-W (ft)    | Direction (°) |
|                   | 0.00                  | 0.00       | 0.00          | 354.72        |

| Plan Sections       |                 |             |                     |            |            |                       |                      |                     |         |                 |
|---------------------|-----------------|-------------|---------------------|------------|------------|-----------------------|----------------------|---------------------|---------|-----------------|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Turn Rate (°/100ft) | TFO (°) | Target          |
| 0.00                | 0.00            | 0.00        | 0.00                | 0.00       | 0.00       | 0.00                  | 0.00                 | 0.00                | 0.00    |                 |
| 1,750.00            | 0.00            | 0.00        | 1,750.00            | 0.00       | 0.00       | 0.00                  | 0.00                 | 0.00                | 0.00    |                 |
| 2,302.72            | 11.05           | 354.72      | 2,299.30            | 52.93      | -4.89      | 2.00                  | 2.00                 | 0.00                | 354.72  |                 |
| 2,660.77            | 11.05           | 354.72      | 2,650.70            | 121.29     | -11.20     | 0.00                  | 0.00                 | 0.00                | 0.00    |                 |
| 3,213.49            | 0.00            | 0.00        | 3,200.00            | 174.22     | -16.09     | 2.00                  | -2.00                | 0.00                | 180.00  | TG1-NMGSA #379  |
| 4,013.49            | 0.00            | 0.00        | 4,000.00            | 174.22     | -16.09     | 0.00                  | 0.00                 | 0.00                | 0.00    | PBHL-NMGSA #379 |



# Scientific Drilling Planning Report



|                  |                            |                                     |                             |
|------------------|----------------------------|-------------------------------------|-----------------------------|
| <b>Database:</b> | EDM 5000.1 Single User Db  | <b>Local Co-ordinate Reference:</b> | Site NMGSA Unit #379        |
| <b>Company:</b>  | Apache Corporation         | <b>TVD Reference:</b>               | GL Elev @ 3563 00ft (Rig ?) |
| <b>Project:</b>  | Lea County, NM (NAD83 NME) | <b>MD Reference:</b>                | GL Elev @ 3563 00ft (Rig ?) |
| <b>Site:</b>     | NMGSA Unit #379            | <b>North Reference:</b>             | Grid                        |
| <b>Well:</b>     | NMGSA Unit #379            | <b>Survey Calculation Method:</b>   | Minimum Curvature           |
| <b>Wellbore:</b> | OH                         |                                     |                             |
| <b>Design:</b>   | Plan #1 - 7-7/8" Hole      |                                     |                             |

## Planned Survey

| Measured Depth (ft)                             | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Turn Rate (°/100ft) |
|-------------------------------------------------|-----------------|-------------|---------------------|------------|------------|-----------------------|-----------------------|----------------------|---------------------|
| 0 00                                            | 0 00            | 0.00        | 0 00                | 0 00       | 0.00       | 0 00                  | 0.00                  | 0 00                 | 0.00                |
| <b>West HL-NMGSA #379 - North HL-NMGSA #379</b> |                 |             |                     |            |            |                       |                       |                      |                     |
| 1,230 00                                        | 0 00            | 0.00        | 1,230 00            | 0.00       | 0 00       | 0 00                  | 0.00                  | 0 00                 | 0 00                |
| <b>8-5/8" Casing</b>                            |                 |             |                     |            |            |                       |                       |                      |                     |
| 1,750 00                                        | 0.00            | 0.00        | 1,750.00            | 0.00       | 0 00       | 0.00                  | 0 00                  | 0 00                 | 0 00                |
| <b>KOP Start Build 2.00°/100'</b>               |                 |             |                     |            |            |                       |                       |                      |                     |
| 1,800.00                                        | 1.00            | 354.72      | 1,800 00            | 0 43       | -0.04      | 0 44                  | 2.00                  | 2.00                 | 0 00                |
| 1,900 00                                        | 3 00            | 354.72      | 1,899.93            | 3.91       | -0.36      | 3.93                  | 2.00                  | 2 00                 | 0.00                |
| 2,000.00                                        | 5 00            | 354.72      | 1,999.68            | 10 86      | -1 00      | 10.90                 | 2.00                  | 2 00                 | 0.00                |
| 2,100 00                                        | 7 00            | 354.72      | 2,099.13            | 21.26      | -1 96      | 21 35                 | 2 00                  | 2.00                 | 0 00                |
| 2,200.00                                        | 9 00            | 354.72      | 2,198.15            | 35 12      | -3 24      | 35 27                 | 2 00                  | 2.00                 | 0 00                |
| 2,300.00                                        | 11 00           | 354.72      | 2,296.63            | 52 41      | -4 84      | 52.63                 | 2 00                  | 2.00                 | 0 00                |
| 2,302.72                                        | 11.05           | 354.72      | 2,299.30            | 52 93      | -4.89      | 53.15                 | 2.00                  | 2.00                 | 0 00                |
| <b>EOC hold 11.05°</b>                          |                 |             |                     |            |            |                       |                       |                      |                     |
| 2,400 00                                        | 11 05           | 354.72      | 2,394.77            | 71.50      | -6 60      | 71.81                 | 0 00                  | 0.00                 | 0 00                |
| 2,500 00                                        | 11.05           | 354.72      | 2,492.92            | 90.60      | -8 37      | 90.98                 | 0.00                  | 0 00                 | 0 00                |
| 2,600 00                                        | 11.05           | 354.72      | 2,591.06            | 109.69     | -10 13     | 110.16                | 0.00                  | 0.00                 | 0 00                |
| 2,660.77                                        | 11.05           | 354.72      | 2,650.70            | 121.29     | -11 20     | 121.81                | 0 00                  | 0.00                 | 0.00                |
| <b>Start Drop 2.00°/100'</b>                    |                 |             |                     |            |            |                       |                       |                      |                     |
| 2,700.00                                        | 10.27           | 354.72      | 2,689.26            | 128 52     | -11.87     | 129.07                | 2.00                  | -2 00                | 0 00                |
| 2,800.00                                        | 8.27            | 354.72      | 2,787.95            | 144.56     | -13 35     | 145.17                | 2.00                  | -2 00                | 0 00                |
| 2,900 00                                        | 6 27            | 354.72      | 2,887.14            | 157 16     | -14 51     | 157.83                | 2.00                  | -2 00                | 0.00                |
| 3,000 00                                        | 4 27            | 354.72      | 2,986.71            | 166.30     | -15 36     | 167.01                | 2 00                  | -2.00                | 0 00                |
| 3,100.00                                        | 2.27            | 354.72      | 3,086.54            | 171.98     | -15.88     | 172.71                | 2 00                  | -2.00                | 0.00                |
| 3,200.00                                        | 0 27            | 354.72      | 3,186.51            | 174 19     | -16 09     | 174.93                | 2.00                  | -2 00                | 0 00                |
| 3,213.49                                        | 0 00            | 0 00        | 3,200 00            | 174 22     | -16 09     | 174.96                | 2.00                  | -2.00                | 0.00                |
| <b>EOC hold 0.00° - TG1-NMGSA #379</b>          |                 |             |                     |            |            |                       |                       |                      |                     |
| 4,013.49                                        | 0.00            | 0 00        | 4,000.00            | 174 22     | -16 09     | 174.96                | 0 00                  | 0 00                 | 0 00                |
| <b>PBHL-NMGSA #379</b>                          |                 |             |                     |            |            |                       |                       |                      |                     |

## Design Targets

| Target Name                                                                     | Dip Angle (°) | Dip Dir. (°) | TVD (ft) | +N/-S (ft) | +E/-W (ft) | Northing (ft) | Easting (ft) | Latitude         | Longitude        |
|---------------------------------------------------------------------------------|---------------|--------------|----------|------------|------------|---------------|--------------|------------------|------------------|
| West HL-NMGSA #379                                                              | 0 00          | 0 00         | 0 00     | 224 22     | -66 09     | 588,440 27    | 868,969 38   | 32° 36' 47.397 N | 103° 16' 9 478 W |
| - hit/miss target                                                               |               |              |          |            |            |               |              |                  |                  |
| - Shape                                                                         |               |              |          |            |            |               |              |                  |                  |
| - plan misses target center by 233 76ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E) |               |              |          |            |            |               |              |                  |                  |
| - Rectangle (sides W0.00 H200.00 D0 00)                                         |               |              |          |            |            |               |              |                  |                  |
| North HL-NMGSA #379                                                             | 0.00          | 0 00         | 0 00     | 224 22     | -66.09     | 588,440 27    | 868,969 38   | 32° 36' 47 397 N | 103° 16' 9 478 W |
| - plan misses target center by 233 76ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E) |               |              |          |            |            |               |              |                  |                  |
| - Rectangle (sides W200 00 H0 00 D0 00)                                         |               |              |          |            |            |               |              |                  |                  |
| TG1-NMGSA #379                                                                  | 0 00          | 0 00         | 3,200.00 | 174 22     | -16 09     | 588,390 27    | 869,019.37   | 32° 36' 46.897 N | 103° 16' 8.899 W |
| - plan hits target center                                                       |               |              |          |            |            |               |              |                  |                  |
| - Point                                                                         |               |              |          |            |            |               |              |                  |                  |
| PBHL-NMGSA #379                                                                 | 0 00          | 0 00         | 4,000 00 | 174.22     | -16 09     | 588,390.27    | 869,019 37   | 32° 36' 46.897 N | 103° 16' 8.899 W |
| - plan hits target center                                                       |               |              |          |            |            |               |              |                  |                  |
| - Circle (radius 50 00)                                                         |               |              |          |            |            |               |              |                  |                  |



Scientific Drilling  
Planning Report



|           |                            |                              |                             |
|-----------|----------------------------|------------------------------|-----------------------------|
| Database: | EDM 5000 1 Single User Db  | Local Co-ordinate Reference: | Site NMGSA Unit #379        |
| Company:  | Apache Corporation         | TVD Reference:               | GL Elev @ 3563.00ft (Rig ?) |
| Project:  | Lea County, NM (NAD83 NME) | MD Reference:                | GL Elev @ 3563.00ft (Rig ?) |
| Site:     | NMGSA Unit #379            | North Reference:             | Grd                         |
| Well:     | NMGSA Unit #379            | Survey Calculation Method:   | Minimum Curvature           |
| Wellbore: | OH                         |                              |                             |
| Design:   | Plan #1 - 7-7/8" Hole      |                              |                             |

Casing Points

| Measured<br>Depth<br>(ft) | Vertical<br>Depth<br>(ft) | Name          | Casing<br>Diameter<br>(") | Hole<br>Diameter<br>(") |
|---------------------------|---------------------------|---------------|---------------------------|-------------------------|
| 1,230.00                  | 1,230.00                  | 8-5/8" Casing | 8-5/8                     | 12-1/4                  |

Plan Annotations

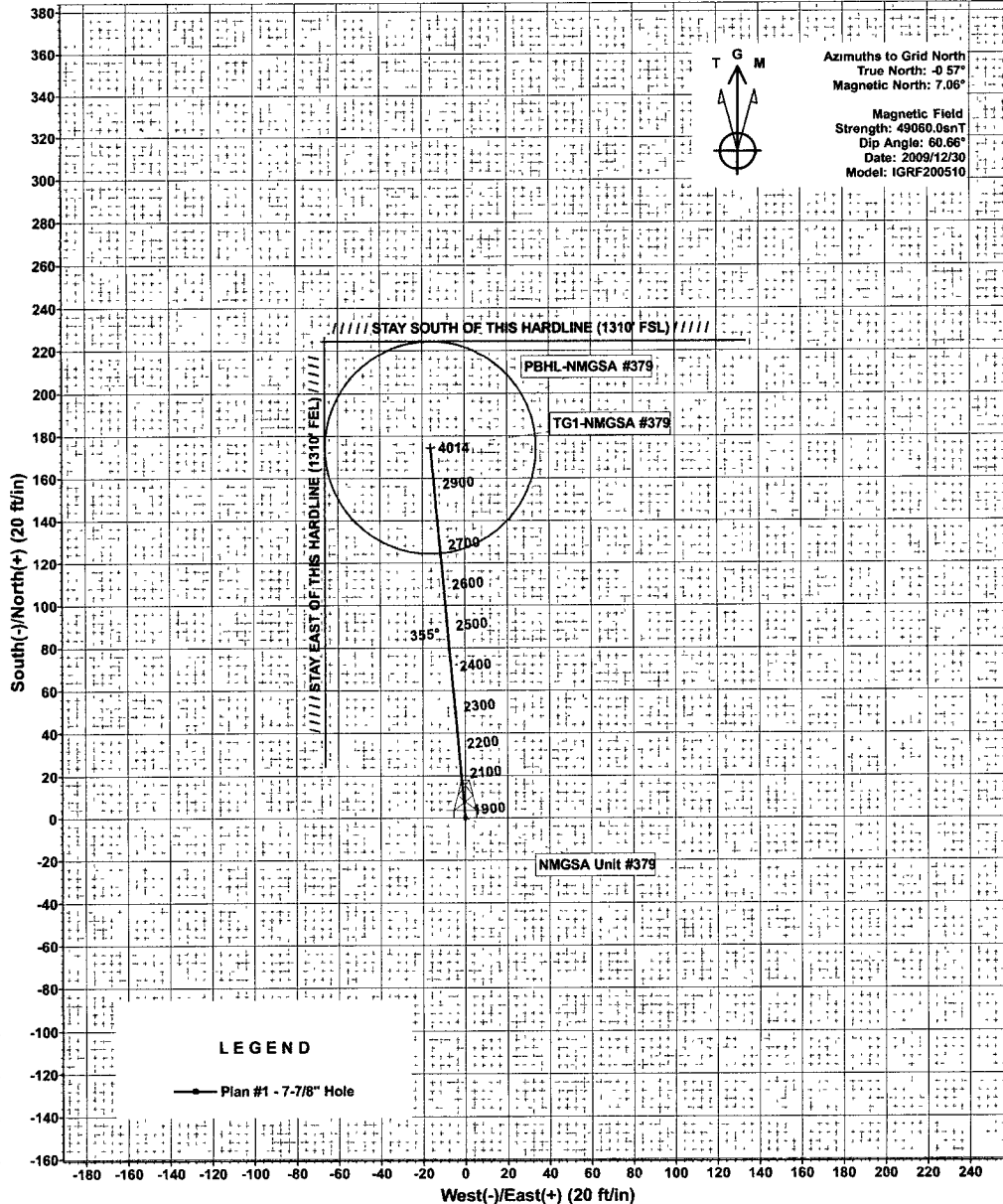
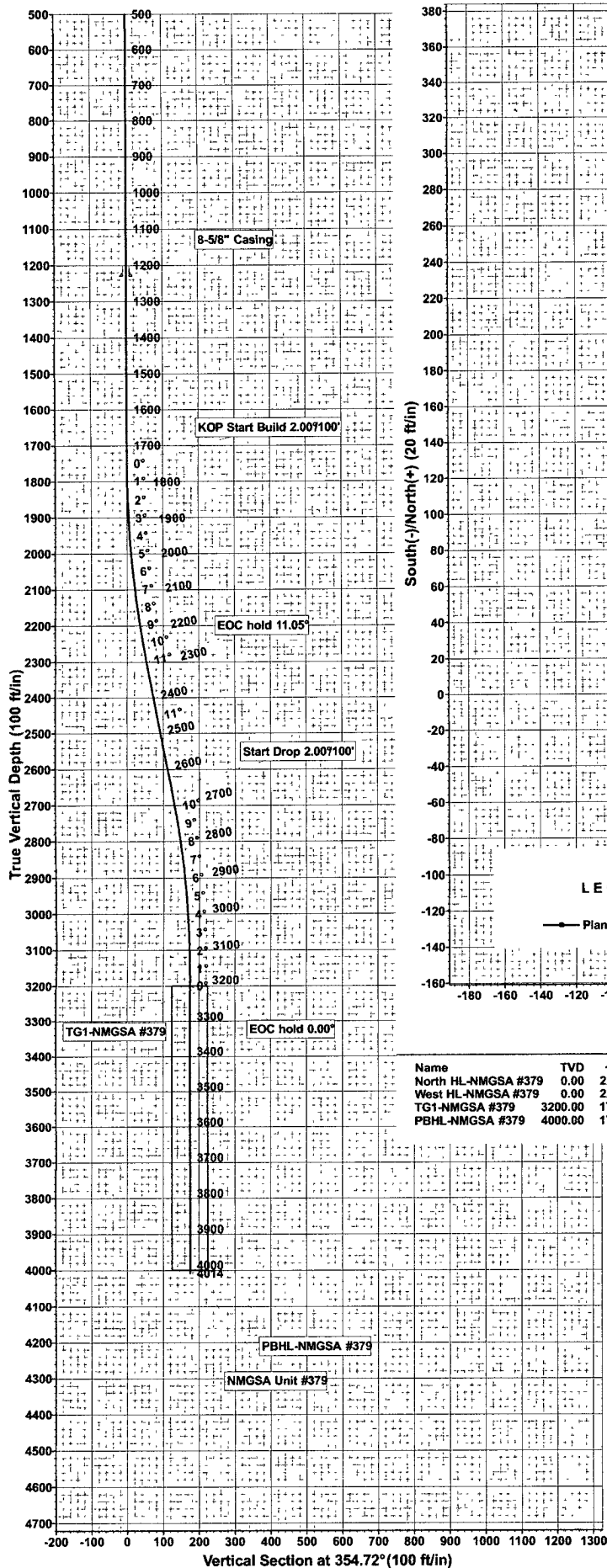
| Measured<br>Depth<br>(ft) | Vertical<br>Depth<br>(ft) | Local Coordinates |               | Comment                    |
|---------------------------|---------------------------|-------------------|---------------|----------------------------|
|                           |                           | +N/-S<br>(ft)     | +E/-W<br>(ft) |                            |
| 1,750.00                  | 1,750.00                  | 0.00              | 0.00          | KOP Start Build 2.00°/100' |
| 2,302.72                  | 2,299.30                  | 52.93             | -4.89         | EOC hold 11.05°            |
| 2,660.77                  | 2,650.70                  | 121.29            | -11.20        | Start Drop 2.00°/100'      |
| 3,213.49                  | 3,200.00                  | 174.22            | -16.09        | EOC hold 0.00°             |



Scientific Drilling for Apache Corporation  
Site: Lea County, NM (NAD83 NME)  
Well: NMGSA Unit #379  
Wellbore: OH  
Design: Plan #1 - 7-7/8" Hole



Scientific Drilling



WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

| Name                | TVD     | +N/-S  | +E/-W  | Northing  | Easting   | Latitude        | Longitude       | Shape                            |
|---------------------|---------|--------|--------|-----------|-----------|-----------------|-----------------|----------------------------------|
| North HL-NMGSA #379 | 0.00    | 224.22 | -66.09 | 588440.27 | 868969.38 | 32°36' 47.397 N | 103°16' 9.478 W | Rectangle (Sides: L0.00 W200.00) |
| West HL-NMGSA #379  | 0.00    | 224.22 | -66.09 | 588440.27 | 868969.38 | 32°36' 47.397 N | 103°16' 9.478 W | Rectangle (Sides: L200.00 W0.00) |
| TG1-NMGSA #379      | 3200.00 | 174.22 | -16.09 | 588390.27 | 869019.37 | 32°36' 46.897 N | 103°16' 8.899 W | Point                            |
| PBHL-NMGSA #379     | 4000.00 | 174.22 | -16.09 | 588390.27 | 869019.37 | 32°36' 46.897 N | 103°16' 8.899 W | Circle (Radius: 50.00)           |

SECTION DETAILS

| Sec | MD      | Inc   | Azi    | TVD     | +N/-S  | +E/-W  | Dleg | TFace  | VSec   | Target          |
|-----|---------|-------|--------|---------|--------|--------|------|--------|--------|-----------------|
| 1   | 0.00    | 0.00  | 0.00   | 0.00    | 0.00   | 0.00   | 0.00 | 0.00   | 0.00   |                 |
| 2   | 1750.00 | 0.00  | 0.00   | 1750.00 | 0.00   | 0.00   | 0.00 | 0.00   | 0.00   |                 |
| 3   | 2302.72 | 11.05 | 354.72 | 2299.30 | 52.93  | -4.89  | 2.00 | 354.72 | 53.15  |                 |
| 4   | 2660.77 | 11.05 | 354.72 | 2650.70 | 121.29 | -11.20 | 0.00 | 0.00   | 121.81 |                 |
| 5   | 3213.49 | 0.00  | 0.00   | 3200.00 | 174.22 | -16.09 | 2.00 | 180.00 | 174.96 | TG1-NMGSA #379  |
| 6   | 4013.49 | 0.00  | 0.00   | 4000.00 | 174.22 | -16.09 | 0.00 | 0.00   | 174.96 | PBHL-NMGSA #379 |

WELL DETAILS: NMGSA Unit #379

| +N/-S | +E/-W | Northing  | Easting   | Ground Level | Latitude        | Longitude       | Slot |
|-------|-------|-----------|-----------|--------------|-----------------|-----------------|------|
| 0.00  | 0.00  | 588216.05 | 869035.46 | 3563.00      | 32°36' 45.172 N | 103°16' 8.731 W |      |

PROJECT DETAILS: Lea County, NM (NAD83 NME)

Plan: Plan #1 - 7-7/8" Hole (NMGSA Unit #379/OH)

Geodetic System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: New Mexico Eastern Zone  
System Datum: Mean Sea Level

Created By: Julio Pina Date: 30-Dec-09

Checked: Date:

Reviewed: Date:

Approved: Date: